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*Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.*

*Therefore, this*

United States Patent

*Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.*

*If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.*

*If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extension.*

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Attest



US005696375A

**United States Patent** [19]

Park et al.

[11] Patent Number: **5,696,375**[45] Date of Patent: **Dec. 9, 1997**[54] **MULTIDEFLECTOR**

5,194,732 3/1993 Bateman ..... 250/294

[75] Inventors: **Melvin Park**, Nashua, N.H.; **Claus Köster**, Lilienthal, Germany*Primary Examiner*—Jack I. Berman*Attorney, Agent, or Firm*—Ward & Olivo[73] Assignee: **Bruker Analytical Instruments, Inc.**, Billerica, Mass.[57] **ABSTRACT**[21] Appl. No.: **560,396**[22] Filed: **Nov. 17, 1995**[51] Int. Cl.<sup>6</sup> ..... **H01J 49/40; H01J 49/28**[52] U.S. Cl. .... **250/287; 250/294**[58] Field of Search ..... **250/287, 294**

A method and apparatus to direct ions away from their otherwise intended or parallel course. Deflectors are used to establish electric fields in regions through which ions are to pass. With such electric fields, ions may be deflected to a desired trajectory. According to the present invention, a multideflector, in the form of a series of bipolar plates spaced evenly across the ion beam path, is used as an ion deflector.

[56] **References Cited****U.S. PATENT DOCUMENTS**

5,117,107 5/1992 Guilhaus et al. .... 250/287

**22 Claims, 14 Drawing Sheets**